

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Peter F. Binderup Hansen et al.

Application No.: 10/533,689

Confirmation No.: 9582

Filed: November 28, 2005

Art Unit: 1791

For: PROCESSES OF FORMING MINERAL
FIBRES

Examiner: J. M. Hoffmann

DECLARATION OF PETER F. BINDERUP HANSEN

I, Peter Farkas Binderup Hansen declare that:

1. I am an employee of the applicant in the above-identified application and in 2002/2003 was the manager of a project involving the investigation of sewage sludge ash activity.

2. As part of this project, I and Andreas Leismann arranged for Dr. Andreas Ehrenberg of the FEhS - Institut für Baustoff Forschung (Institute of Building Materials Research) to carry out experiments testing the effect of sewage sludge ash on the strength of cement briquettes suitable for use in the production of mineral fibers. The results of these experiments are contained in the report entitled "Investigations on sewage sludge incineration ash" dated April 14, 2003.

3. The report "Investigations on sewage sludge incineration ash" demonstrates that after 2 days of storage briquettes containing no sewage sludge ash had an average compressive strength (based on three values) of 4.4 MPa. The inclusion of 5% sewage sludge ash in the briquettes unexpectedly resulted in a greater compressive strength after 2 days than the compressive strength of the briquettes containing no sewage

sludge ash. The inclusion of 20% sewage sludge ash in the briquettes resulted in a compressive strength after 2 days that is inferior both to the compressive strength of briquettes containing no sewage sludge ash and to the compressive strength of briquettes containing 5% sewage sludge ash.

4. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 11 June 2010


Peter Farkas Binderup Hansen



FORSCHUNGSGEMEINSCHAFT EISENHÜTTENSCHLACKEN E. V.

Dr A. Ehrenberg /
F O R S C H U N G S I N S T I T U T

BLIERSHEIMER STR. 62, D-47229 DUISBURG, GERMANY

PHONE 49 / (0) 20 65 / 99 45 - 0

FAX 49 / (0) 20 65 / 99 45 - 10

E-MAIL a.ehrenberg@fehs.de

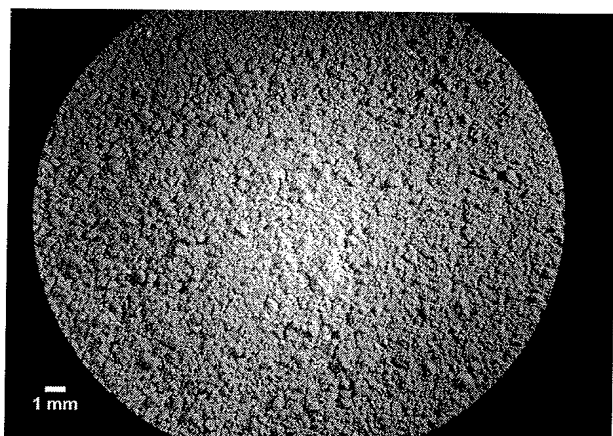
INTERNET <http://www.fehs.de>

14.04.03

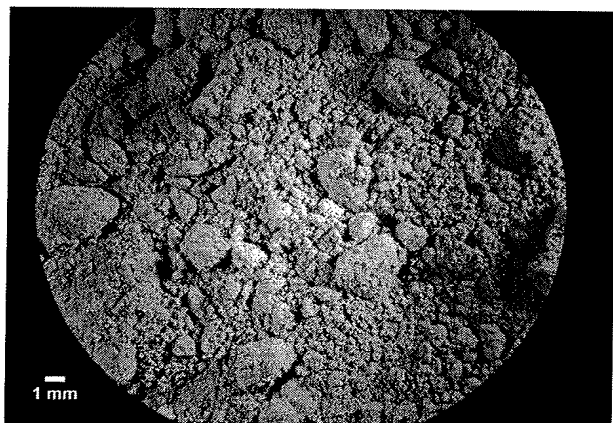
Investigations on sewage sludge incineration ash

- preliminary results -

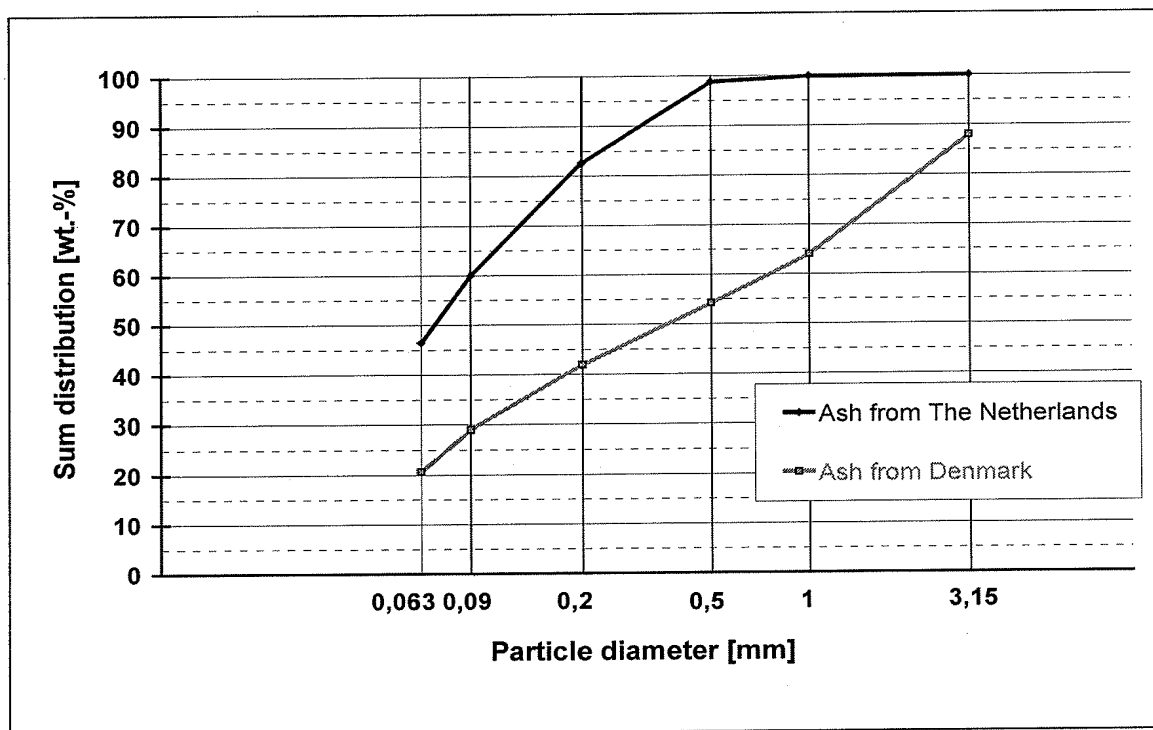
Material characterisation



Sewage sludge incineration ash
The Netherlands (E-030462)



Sewage sludge incineration ash
Denmark (E-030372)



Grain size distributions of both ashes

- Ash from The Netherlands:

0.10 wt.-% moisture, 17.2 wt.-% P_2O_5 , 1.10 wt.-% loss on ignition.

0.1 mg/l P in solution after 24 hours shaking test acc. to DIN 38414-1 (liquid/solid 10:1, 190 g dried sample, 1.9 l water), i. e. that only 0.001 wt.-% of the total P content is solved.

- Ash from Denmark:

0.15 wt.-% moisture, 25.1 wt.-% P_2O_5 , 1.66 wt.-% loss on ignition.

2.2 mg/l P in solution after 24 hours shaking test acc. to DIN 38414-1, i. e. that only 0.02 wt.-% of the total P content is solved.

- Recycling material from Neuburg plant:

6.3 wt.-% moisture

Mixtures (without water)

Material:	A	B	C	CEM I 42,5 R
	Neuburg plant	Ash NL	Ash DK	GeoBrick B
No.:	030524	030462	030372	030561
1	86.0 wt.-%	-	-	14 wt.-%
2	81.0 wt.-%	5 wt.-%	-	14 wt.-%
3	81.0 wt.-%	-	5 wt.-%	14 wt.-%
4	66.0 wt.-%	20 wt.-%	-	14 wt.-%
5	66.0 wt.-%	-	20 wt.-%	14 wt.-%
6 *	72.3 wt.-%	-	13.7 wt.-%	14 wt.-%

P₂O₅ content is equivalent to No. 4

All mixtures have been set to a total moisture of 16 wt.-% (earth-moist consistency).
Storing conditions of the 10 cm-cubes: Temperature 19-21 °C, humidity 93-95 %

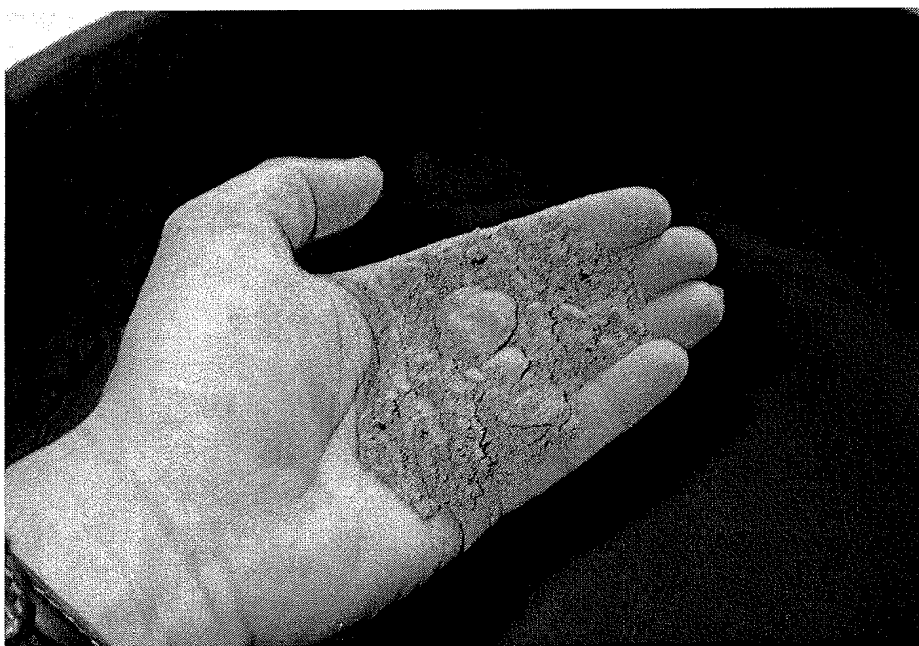
Strength development (average based on 3 values)

Mixture	Apparent density [g/cm ³]			Compressive strength [MPa]	
	fresh	2 days	5 days	2 days	5 days
1	1.98	1.92	1.96	4.4	9.7
2	1.86	1.86	1.80	4.6	6.5
3	1.87	1.99	1.86	6.0	6.1
4	1.57	1.53	1.55	3.0	4.7
5	1.55	1.55	1.53	1.5	2.3
6	1.68	1.66	1.69	2.2	4.0

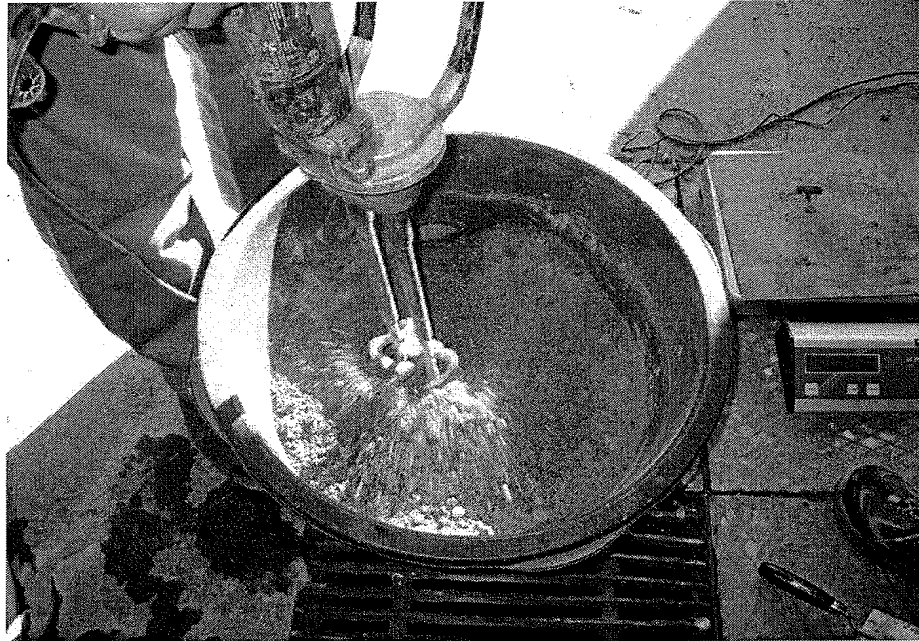
How to prepare the test samples



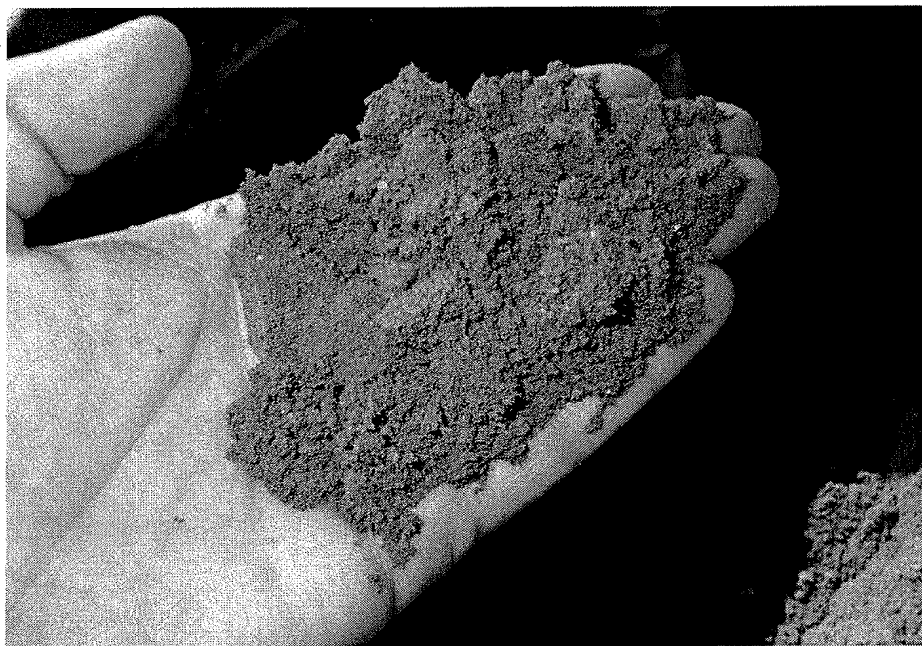
Pre-mixing without water (No. 3)



Dry mixture (No. 5)



Mixing with water (No. 2)



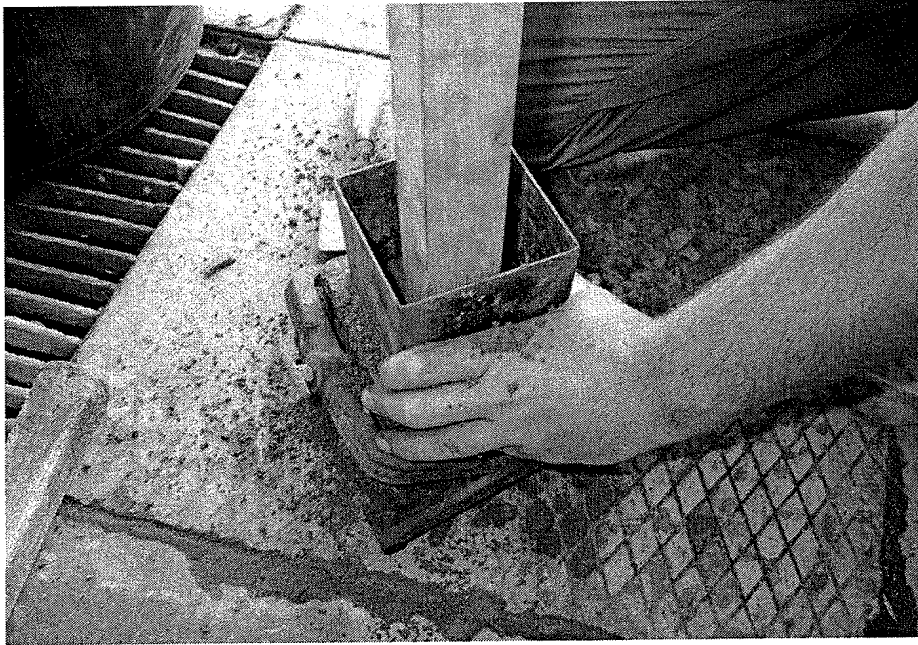
Earth-moist consistency (No. 4)



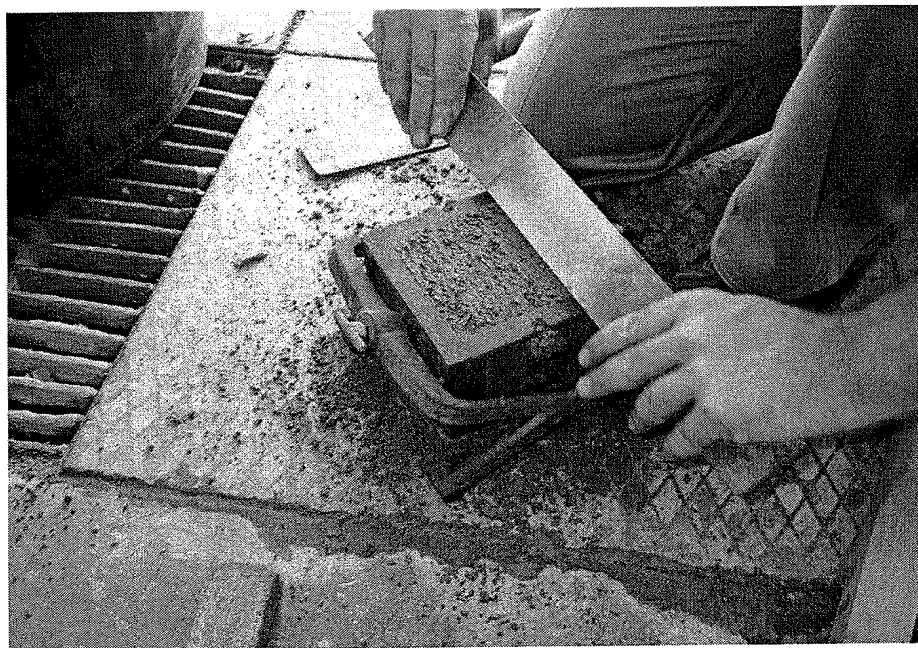
Compacted first layer (No. 2 cube 1)



Filling the second layer (No. 3 cube 3)



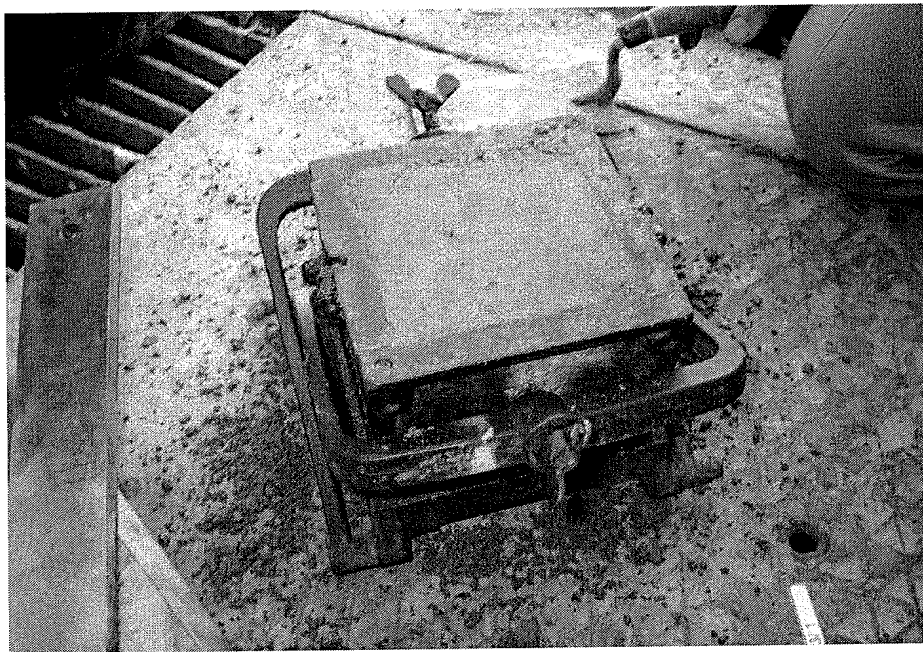
Compacting the second layer (No. 2 cube 1)



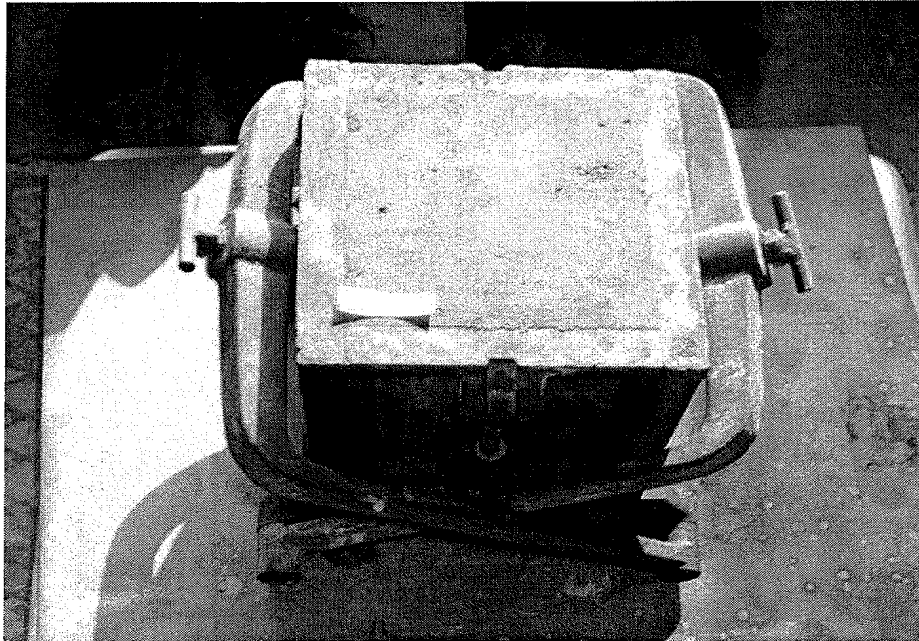
First smoothing (No. 2 cube 1)



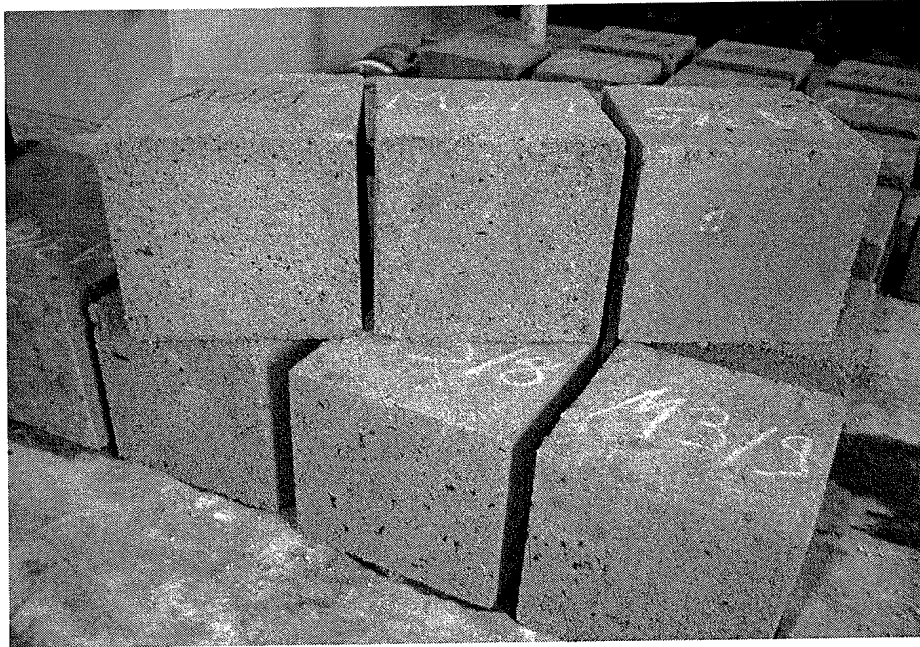
Second smoothing (No. 2 cube 1)



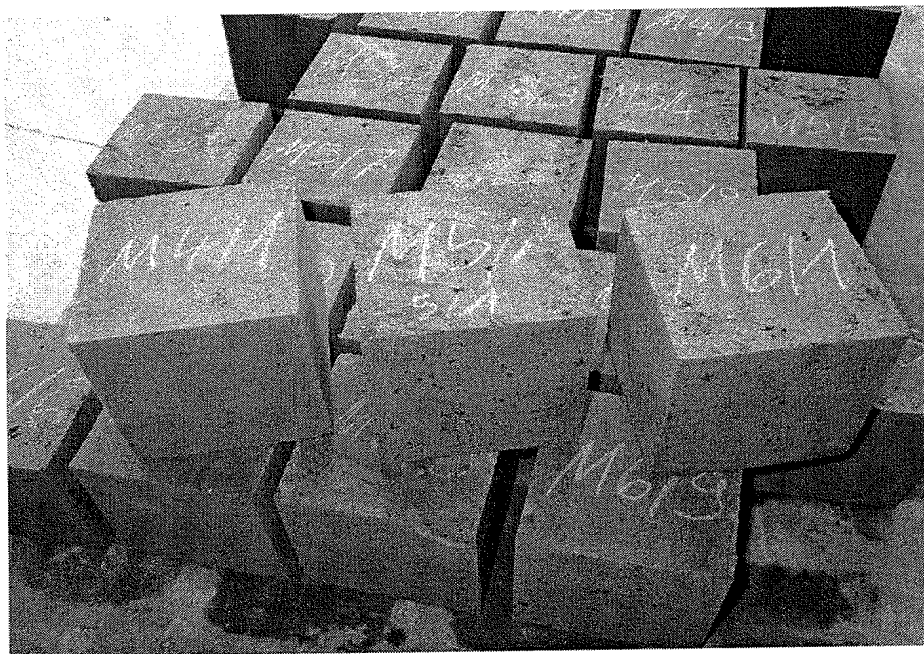
Finished cube (No. 3 cube 3), 1.937 g/cm³



Finished cube (No. 4 cube 1), 1.608 g/cm³



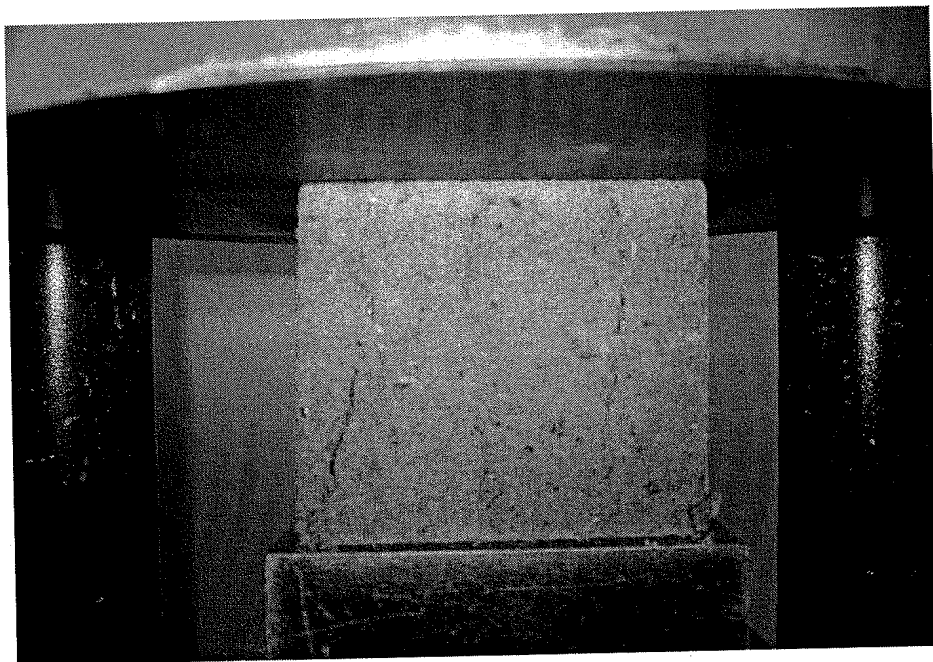
No. 1 cube 1, No. 1 cubes 1 and 5, No. 3 cubes 8 and 9



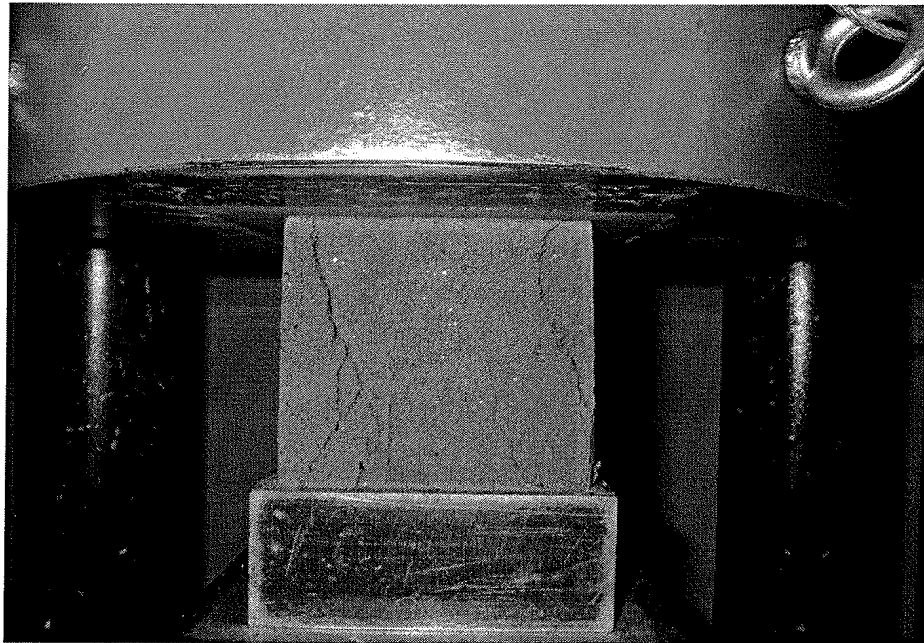
No. 4 - 6 cubes 1



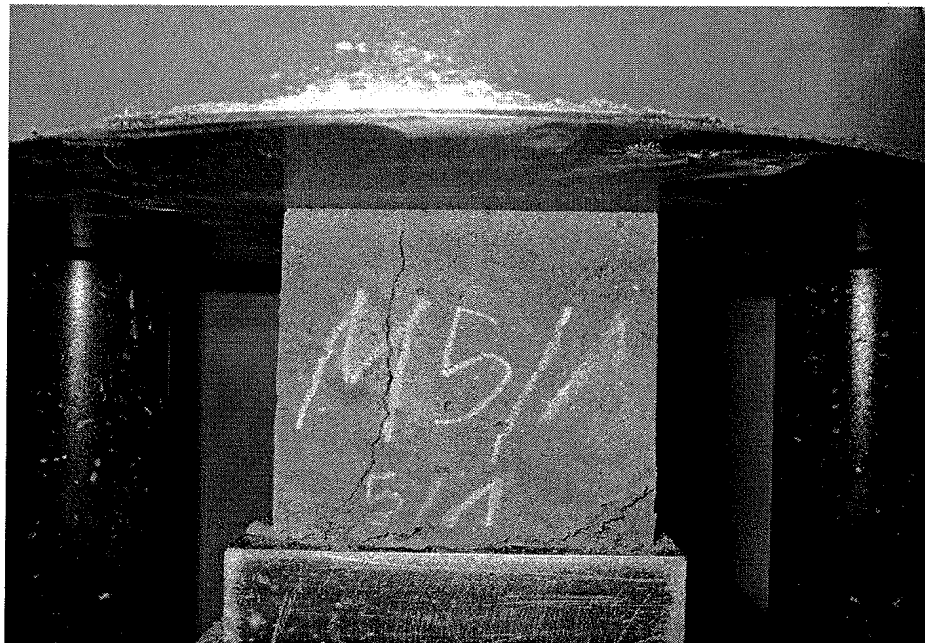
No. 2 cube 1, tested after 2 days (5.6 MPa)



No. 3 cube 1, tested after 2 days (4.5 MPa)



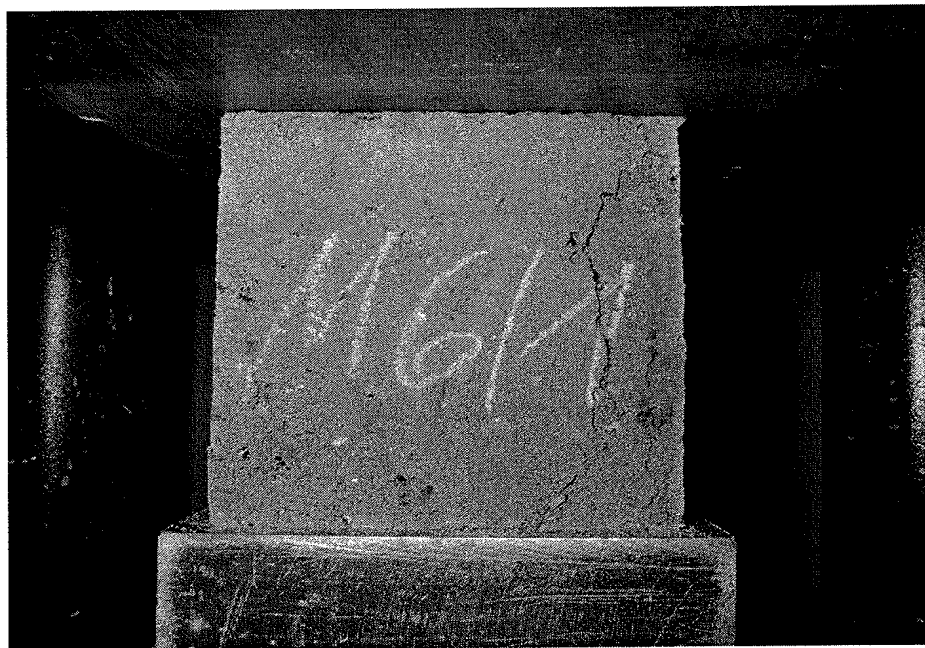
No. 4 cube 1, tested after 2 days (3.9 MPa)



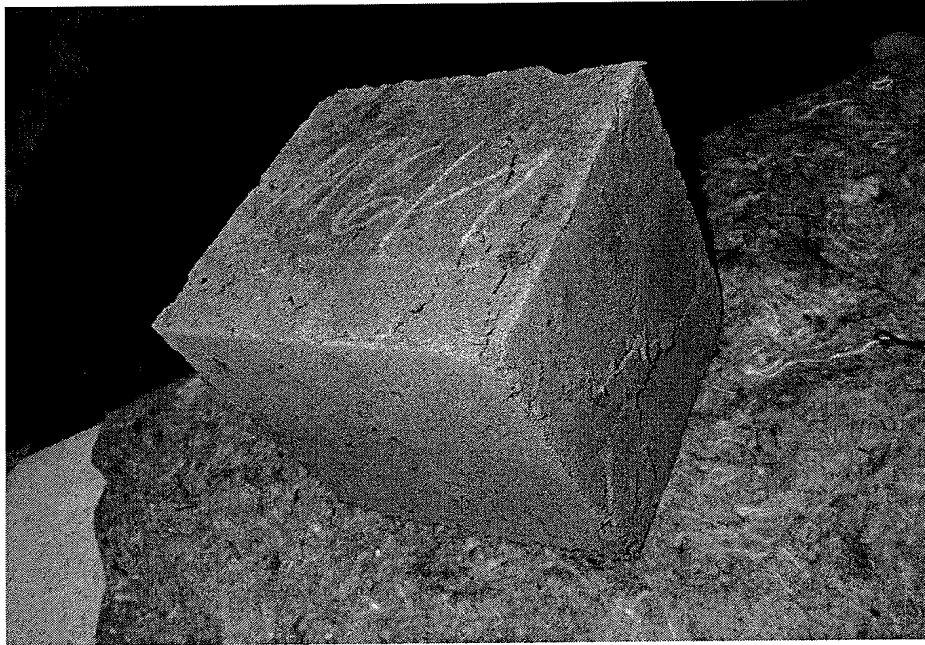
No. 5 cube 1, tested after 2 days (2.1 MPa)



No. 5 cube 2, tested after 2 days (1.2 MPa)



No. 6 cube 1, tested after 2 days (2.7 MPa)



No. 6 cube 1, tested after 2 days (2.7 MPa)



No. 4 cube 4, tested after 5 days (4.8 MPa)



No. 5 cube 4, tested after 5 days (2.3 MPa)



No. 6 cube 4, tested after 5 days (4.6 MPa)